

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

Aeroplane Engine Competition.

Hearty congratulations to the Green Engine Company, Ltd., for the honour it has achieved in carrying off the prize of £5,000 offered by the Army Council in connection with the competition recently concluded in this country in connection with naval and military aeroplane engines. The award was made on the recommendation of the Judges' Committee to that Company's No. 1 100 h.p. water-cooled engine, which, to quote from the official *communiqué*, "best fulfilled the requirements of the competition, and possessed the greatest percentage of attributes desirable in an aeroplane engine."

It is now many years since the Green engine made its appearance. If we remember aright, it was at one of the early motor shows at the Agricultural Hall that the progenitor of the successful aviation motor of to-day made its bow to the public in the form of a small motor cycle engine, which even then attracted considerable attention owing to the advanced character of its design. Since that time, Mr. Green and those associated with him have laboured unceasingly—labours that have now been crowned with a success that should more than atone for the struggles and anxious times they must undoubtedly have passed through.

The success of the Green engine in carrying off the biggest prize that has so far been offered in England in

connection with aerial engines, was not altogether unexpected, for it had previously demonstrated itself as being, from every point of view, of extremely high efficiency. Thus, it may be recalled that out of seven competitions for the Michelin trophies offered for the longest or fastest flights on aeroplanes of all-British construction, the Green engine has captured six. No one completed the tests for the eighth Michelin prize, but a Green-engined machine was leading, and only failed to complete the cross-country course through the petrol supply failing. Both the Alexander Prize competitions for 24 hours' non-stop engine-runs on a test bench were won by Greens; Mr. Hawker's splendid effort to win the *Daily Mail's* Seaplane Circuit of Great Britain was made with a Green-engined Sopwith, which put up a world's record for seaplane flying in the attempt. It was again with a Green engine that Mr. J. T. C. Moore-Brabazon won, in 1909, the *Daily Mail* prize of £1,000 for the first circular mile flight flown on an all-British aeroplane; and finally it was on a Green-engined Sopwith flying-boat that Mr. Hawker, in July, 1913, won the Mortimer-Singer prize of £500 for the first all-British combination to make with passenger six out and home five-mile flights, alighting at each turning point, one of which had to be at least one mile from the shore.

In thus congratulating the Green Company on its achievement, we must not overlook the excellent service to the movement that has been rendered by the other firms which took part in the competition, seven of which presented engines that successfully performed the eliminating trial of a six-hour continuous run on full power, an award of £100 being made in respect of each engine completing that test. The fact that one engine comes out at the top of the list does not mean that the others are, to put it bluntly, "no good." On the contrary, each one of the engines that has secured an award represents a type or make that can be successfully used for the propulsion of aircraft, and that this is realised in official quarters is evident from the fact that several of these firms are at present very busily engaged on Government orders. Doubtless each of the concerns that took part in the competition have thereby learnt many useful lessons, the result of which will be embodied in their future designs and productions, for, efficient as the aeroplane engine has become, it is almost needless to point out that the last word is far from having been said.

There is one other aspect of the competition to which attention may usefully be drawn. At one time, this country was largely dependent on the Continent for the engines for

its aircraft—a position which was rightly regarded as being vitally wrong. Fortunately, this state of things no longer obtains, for not only has the result of the competition proved complete efficiency in an engine of British design and construction throughout, but it will also be noticed that British engines comprise exactly one-half of the different makes that secured awards. Thus, Great Britain has now arrived at a period when it is no longer dependent on other countries for aircraft engines, for in addition to those of a complete all-British character, there are also available several successful types, which, while of Continental origin, are also now being produced in British workshops by British workmen.

♦ ♦ ♦

Better than Iron Crosses. The present European war is unique in at least two special directions; first, in regard to the extended and successful employment of motor transport in all branches of the military operations, and, not secondly, but, from our point of view, foremost, the extremely valuable work that has been, and is being, achieved by aircraft. As compared with motor transport, the aeroplane is a younger development in the application of the internal-combustion engine, but, younger though it be, it is none the less doing its full part in the great struggle for victory over the world's enemy.

Time was, and that not so very long ago, when many criticisms were raised—and rightly—as to the relative position of this country as compared with that of Continental nations, from a military aviation point of view. Fortunately, in the nick of time, a free hand was given to the Executive, with the result that by supreme efforts the leeway due to the procrastination in the past of the Government has been made up, and enabled the splendid *personnel* of our air services to prove themselves fully the equal of any now in the field.

Field-Marshal Sir John French, the Commander-in-Chief of the British Expeditionary Force, has, unfortunately, been too busily engaged otherwise to send home many despatches as to the progress of events at the front, but each of those he has submitted has contained highly complimentary references to the work that is being achieved by the Royal Flying Corps. His words are relatively few, but are very much to the point, and will, doubtless, be more appreciated by those to whom they refer than all the innumerable Iron Crosses put together, which the Kaiser is reported to be awarding to his men. Although, doubtless, the Field-Marshal's latest message has already been read far and wide, we feel we are justified in giving special prominence in the editorial columns of *FLIGHT* to the praise he has unreservedly given to the Royal Flying Corps, which, although undoubtedly well-deserved, is none the less a welcome tribute. The extracts from Sir John French's latest despatches are as follows:—

"Sir David Henderson and the Royal Flying Corps under his command have again proved their incalculable value. Great strides have been made in the use of aircraft in the tactical sphere by establishing effective communication between aircraft and units in action.

"In my despatch of September 7th, I mentioned the name of Brigadier-General Sir David Henderson and his valuable work in

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For the Troops at the Front.

LADY FRENCH, wife of Field-Marshal Sir John French, has had such a generous response to her appeal for comforts for the soldiers at the front, that she finds her house inadequate for storing the large quantity of

command of the Royal Flying Corps, and I have once more to express my deep appreciation of the help he has since rendered me."

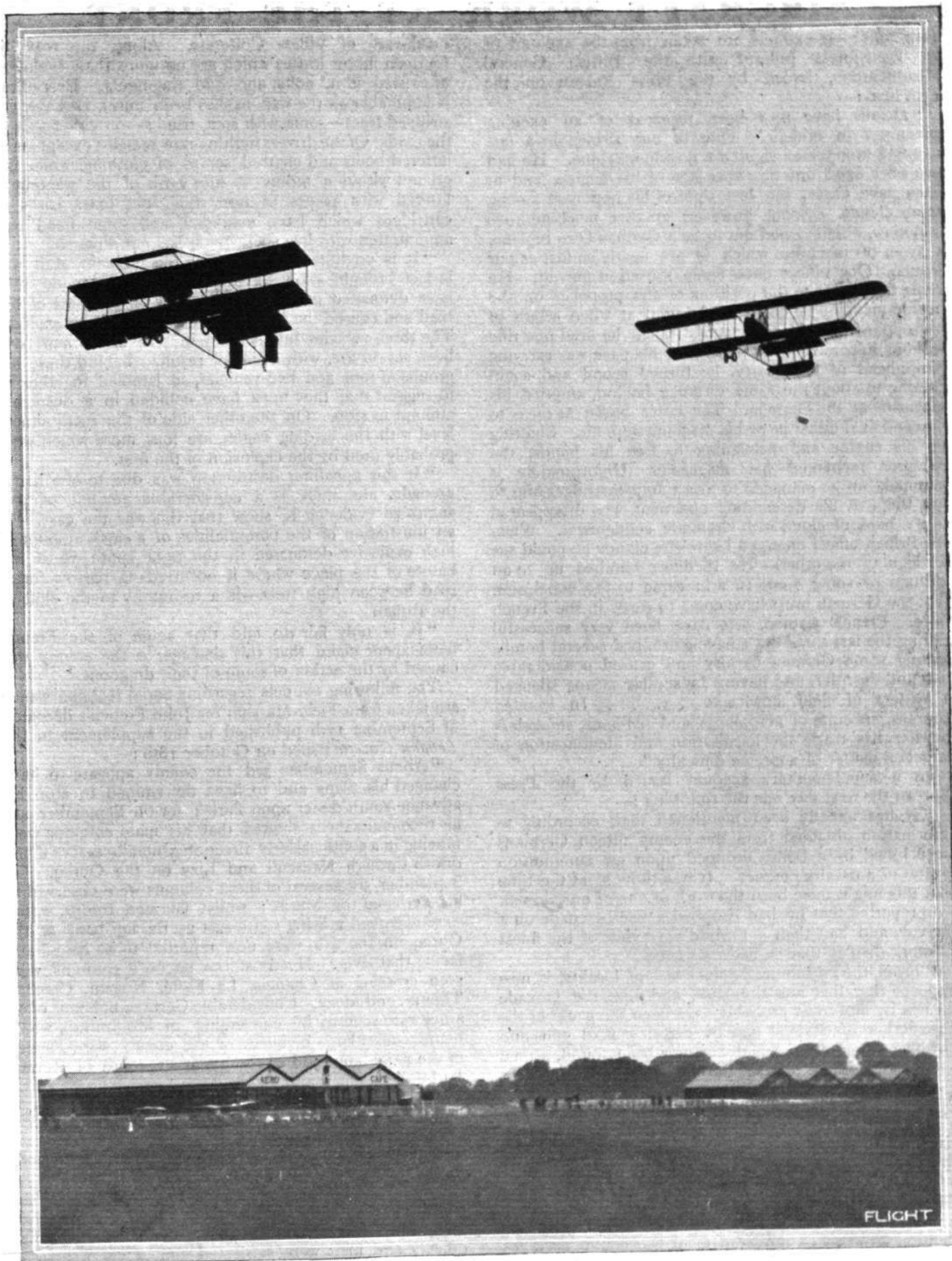
Thus, once again, the existence of British energy, perseverance, and pluck—for it requires no small measure of the latter to undertake work associated with such great risks—have been demonstrated to be no chimera, but a solid reality. The Field-Marshal does not particularise the work our flying officers are doing in the war, but at times some slight reference emerges in the reports of the official "eye-witness" issued by the Press Bureau, which must, we presume, satisfy for the moment. From the communications of many of the special correspondents in France of our daily papers fortunately we obtain now and again some slight glimpses of the glorious work being accomplished. Thus from official sources it is stated that up to September 21st the mileage made by our flying officers since the beginning of the war amounted to no less than 87,000 miles, an average of 2,000 miles a day. Hitherto the names of the officer pilots who have been carrying through this important section of the military operations—that of keeping our commanding officers in touch with the disposition of the enemy—have not generally been known, but Sir John French has now filled this *lacune* by including in his long list of those in the different branches of the Army service singled out for special mention the names of nearly thirty flying officers who have earned distinction in the carrying out of their duties, and whom we in this country have every reason to honour.

Although no similar eulogium has as yet been issued with regard to the operations of the Royal Naval Air Service, this branch of the country's protection is none the less doing extremely valuable work, probably much more than can be realised by the general public. That which has been allowed to transpire—particularly the daring visit of several of the Service pilots to Cologne and Düsseldorf—has, indeed, perhaps not been so well appreciated here as it has been from the enemy's point of view. In Germany, according to an official notice issued in that country, it has produced in certain circles of the population "a feeling that is not in accord with the energetic and vigorous characteristics of the German people."

In other words, the Germans, since the appearance of British aircraft, are showing themselves to be by no means the fearless and philosophical creatures they would have us believe. Indeed, on the other hand, they are proving themselves to be extremely nervous and worried, especially in the Düsseldorf district, where the military officer in command has found it necessary to issue a long proclamation imploring the frightened townsfolk to calm themselves. It is a mistake to despise one's enemy, and it would be foolish to ignore the reality of the German menace; at the same time, we cannot forget that these are the people who aspire to dominate the world and fancied at the outset that it was just a "walk over." Results have shewn that the enemy is far from having it all his own way, and we of *FLIGHT* are happy in the thought that the aircraft section of our Naval and Military Services are in this task of not merely holding up but of pushing back the Germans, playing an invaluable part.

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goods which have been received. She asks that any further contributions of mufflers or money may be sent to 39, Berkeley Square, W. (which has been lent for the purpose by Mr. and Mrs. Almeric Paget), and all other goods such as socks, belts, &c., to 54, Beauchamp Place, S.W.



CLOSE FINISHING AT HENDON DURING THE SUMMER RACING SEASON.—Mr. Lillywhite on the Grahame-White biplane and Mr. Birchenough on a Maurice Farman.

AIRCRAFT WORK AT THE FRONT.

THE following extracts are taken from the account of an eye-witness present with the British General Headquarters, issued by the Press Bureau on the 15th inst. :—

"Details have now been received of an exciting encounter in mid-air. One of our airmen in a fast scouting monoplane sighted a hostile machine. He had two rifles fixed, one on either side of his engine, and at once gave chase, but lost sight of his opponent among some clouds. Soon, however, another machine hove into view, which turned out to be a German Otto biplane, a type of machine which is not nearly so fast as our scouts. Our officer once again started in pursuit. He knew that owing to the position of the propeller on the hostile machine he could not be fired at when astern of his opponent. At sixty yards' range he fired one rifle without apparent result; then, as his pace was carrying him ahead of his quarry, he turned round and, again coming to about the same distance behind, emptied his magazine at the German. The latter began at once to descend as if either he or his machine were hit. Shutting off his engine and volplaning to free his hands, the pursuer recharged his magazine. Unfortunately it jammed, but he managed to insert four cartridges and to fire them at his descending opponent, who disappeared into a bank of cloud with dramatic suddenness. When the British officer emerged below the clouds he could see no sign of the other. He therefore climbed up to an altitude of some 7,000 ft. and came to the conclusion that the German must have come to earth in the French lines. French airmen, too, have been very successful during the last three days, having dropped several bombs among some German cavalry and caused considerable loss and disorder, and having by similar means silenced a battery of field howitzers. . . . In wooded country, in spite of aeroplanes and balloons, smokeless powder has made the localisation and identification of targets a matter of supreme difficulty."

In a supplementary account issued by the Press Bureau the next day was the following :—

"It has already been mentioned that, according to information obtained from the enemy, fifteen Germans were killed by a bomb dropped upon an ammunition wagon of a cavalry column. It was thought at the time that this might have been the work of one of our airmen, who reported that he had dropped a hand-grenade on a convoy, and had then got a bird's-eye view of the finest firework display that he had ever seen."

"From the corroborative evidence of locality, it now appears that this was the case, and that the grenade thrown by him must probably have been the cause of the destruction of a small convoy carrying field gun and howitzer ammunition, which has now been found, a total wreck, on a road passing through the Forêt de Retz,

north-east of Villers Cotterets. Along the road lie fourteen motor lorries which are no more than skeletons of twisted iron, bolts, and odd fragments. Everything inflammable on the wagons has been burnt, as have the stripped trees—some with split trunks—on either side of the road. Of the drivers nothing now remains except some tattered boots and charred scraps of clothing, while the ground within a radius of fifty yards of the wagons is littered with pieces of iron, the split brass cases of cartridges which have exploded, and some fixed gun ammunition with live shell which has not done so.

"It is possible to reconstruct the incident, if it was in fact brought about as supposed. The grenade must have detonated on the leading lorry on one side of the road and caused the cartridges carried by it to explode. The three vehicles immediately in rear must then have been set on fire, with a similar result. Behind these are groups of four and two vehicles, so jammed together as to suggest that they must have collided in a desperate attempt to stop. On the other side of the road, almost level with the leading wagon, are four more which were probably fired by the explosion of the first.

"If this appalling destruction was due to one hand-grenade, and there is a considerable amount of presumptive evidence to show that this was the case, it is an illustration of the potentialities of a small amount of high explosive detonated in the right spot; whilst the nature of the place where it occurred—a narrow forest road between high trees—is a testimony to the skill of the airman.

"It is only fair to add that some of the French newspapers claim that this damage to the enemy was caused by the action of some of their dragoons."

The following extracts regarding aerial reconnaissance are taken from Field-Marshal Sir John French's despatch of September 17th published in the supplement to the *London Gazette* issued on October 18th :—

"About September 3rd the enemy appears to have changed his plans and to have determined to stop his advance south direct upon Paris; for on September 4th air reconnaissances showed that his main columns were moving in a south-easterly direction generally east of a line drawn through Nanteuil and Lizy on the Ourcq. On September 5th several of these columns were observed to have crossed the Marne; whilst German troops, which were observed moving south-east up the left bank of the Ourcq on the 4th, were now reported to be halted and facing that river. Heads of the enemy's columns were seen crossing at Changis, La Ferté, Nogent, Château Thierry, and Mezy. Considerable German columns of all arms were seen to be converging on Montmirail, whilst before sunset large bivouacs of the enemy were located in the neighbourhood of Coulommiers, south of Rebais, La Ferté-Gaucher, and Dagny."

"MENTIONED IN DESPATCHES."

HEREWITH we give the extracts from Field-Marshal Sir John French's despatch of the 8th inst. in which reference is made to the work of the Royal Flying Corps (Military Wing), together with the list of officers, non-commissioned officers and men brought forward for special mention for services rendered from the commencement of the campaign up to the date of the despatch :—

"Sir David Henderson and the Royal Flying Corps under his command have again proved their

incalculable value. Great strides have been made in the development of the use of aircraft in the tactical sphere by establishing effective communication between aircraft and units in action. It is difficult to describe adequately and accurately the great strain to which officers and men were subjected almost every hour of the day and night throughout this battle. . . .

"In my despatch of 7th September I mentioned the name of Brigadier-General Sir David Henderson and

his valuable work in command of the Royal Flying Corps; and I have once more to express my deep appreciation of the help he has since rendered me.

Royal Flying Corps.

Lieut. K. P. Atkinson, Royal Field Artillery.
 Capt. R. A. Boger, Royal Engineers.
 Lieut. I. M. Bonham-Carter, Northumberland Fusiliers.
 Capt. V. J. D. Bourke, Oxford and Bucks Light Infantry.
 Capt. A. B. Burdett, York and Lancaster Regiment.
 Brevet-Major C. J. Burke, Royal Irish Regiment.
 Lieut. (temporary Capt.) G. I. Carmichael, Royal Field Artillery.
 Lieut. A. Christie, Royal Field Artillery.
 Lieut. E. L. Conran, 2nd County of London Yeomanry.
 Capt. G. W. P. Dawes, Royal Berkshire Regiment.
 Lieut. L. Dawes, Middlesex Regiment.
 Capt. E. W. Furse, Royal Field Artillery.
 Capt. H. C. Jackson, Bedford Regiment.
 Lieut. P. B. Joubert de la Ferté, Royal Field Artillery.
 Lieut. D. S. Lewis, Royal Engineers.
 Brevet-Major C. A. H. Longcroft, Welsh Regiment.

Lieut. Mapplebeck, R.F.C.
 Lieut. W. G. S. Mitchell, Highland Light Infantry.
 Lieut. W. M. Noel, Liverpool Regiment.
 Lieut. C. E. C. Rabagliati, Yorkshire Light Infantry.
 Brevet-Major G. R. Raleigh, Essex Regiment.
 Brevet-Major J. M. Salmond, Royal Lancaster Regiment.
 Lieut. R. G. D. Small, Leinster Regiment.
 Lieut. (temporary Captain) A. H. L. Soames, 3rd Hussars.
 Second-Lieut. N. C. Spratt, R.F.C. (S.R.).
 Brevet-Major (temporary Lieut.-Col.) F. H. Sykes.
 Capt. F. F. Waldron, 19th Hussars.
 Second-Lieut. C. W. Wilson, R.F.C. (S.R.).
 No. 18, Flight-Sergeant C. Cullen, R.F.C.
 No. 25, Flight-Sergeant H. Goodchild, R.F.C.
 No. 30, Sergeant W. Jones, R.F.C.
 No. 346, Sergeant M. Keegan, R.F.C.
 No. 775, Corporal S. Kemp, R.F.C.
 No. 808, Sergeant-Major E. J. Parker, R.F.C.
 No. 3, Sergeant-Major J. Ramsay, R.F.C.
 No. 816, Flight-Sergeant A. M. Saywood, R.F.C.
 No. 151, Sergeant A. Wilson, R.F.C.

GERMANY'S AIRSHIPS.

In view of the discussion of the possibilities of a German aerial invasion, which has occupied the columns of the daily press recently, a few notes regarding the airship equipment of Germany may be of use in helping our readers to get some ideas as to the pros and cons. of such a project. In order to facilitate a survey of the various types of airships, as well as the characteristics of individual dirigibles, the accompanying table has been compiled giving as full particulars as can be obtained. In the table are included all German airships of the most successful types constructed since 1910. The airships built previous to that year have been ignored, as they were of little practical value for military purposes. Of those included in the table several, it will be noticed, have either been wrecked before the war or have been brought down by the Allies since the commencement of the war. We have, however, retained them in the table in order to maintain the continuity, and to give an idea of the development of the various types.

One of the difficulties of identification of individual airships arises from the practice employed by the German Government of changing the name of an airship when it is taken over by the authorities, so that, to mention an example, the Schütte-Lanz III becomes L 4. By referring to the columns giving the name of the constructor, and the trial trip date, it is possible to trace the ancestry, as it were, of any particular airship. In one case, for instance, the airship numbered Z I is obviously a replacement, since it is found to be built in 1913, and the next two, the Z. II and the Z. III were built in 1911 and 1912 respectively.

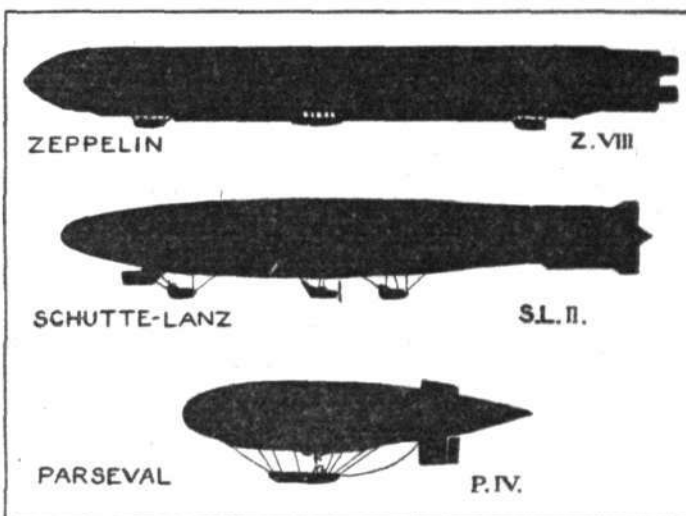
The table, it will be noticed, is divided into three subdivisions according to whether the dirigibles are owned by the German War Office, the Navy or privately. Of those found in the list of privately owned airships, at least three have been taken over by the authorities, the Sachsen, the Hansa and the Viktoria Luise, which are now used by the German Navy. Any other suitable private dirigibles have doubtless by this time been commandeered also.

As to the actual number of airships, rigid, non-rigid, and semi-rigid, possessed by Germany at the present day, it is impossible to ascertain, those included in the accompanying table representing only the dirigibles officially acknowledged, but it is to be presumed that the construction of new ships has been greatly accelerated since the commencement of the war, so that the number

now in existence may shortly exceed materially the 28 found in the table.

Before going into details regarding individual dirigibles, it is as well to describe briefly the more important types in use by the German authorities. First there is the rigid type, to which belong the Zeppelins and the Schütte-Lanz. Secondly, there is the semi-rigid type, represented by the military type "M" airships. Thirdly, there is the non-rigid type, the most famous representative of which is the Parseval airship.

Of the three types the first—the rigid—is the one with which Germany has experimented most extensively and



Silhouettes showing the relative sizes of the three types: Zeppelin, Schütte-Lanz and Parseval.

of which she has more experience than any other country. Most notable among the airships of this class are, of course, the Zeppelins, the experiments with which date as far back as 1900, when Count Zeppelin constructed his first dirigible in a floating shed on Lake Constance. Since then, although numerous improvements have taken place, this constructor has not departed fundamentally from the original type, and has persevered in the face of disaster after disaster with determination to improve the type to which he has pinned his faith. The construction of the Zeppelins is, as the majority of our readers are no doubt aware, carried out extensively in

GERMANY'S AIRSHIPS.

Reference No.	Type.	Name.	Length.	Greatest Diameter.	Greatest Width.	Height.	Capacity.	Maximum Attainable Height.	Useful Load.	Speed.	Fuel Capacity.	Total h.p.	No. of Screws.	H. P., Make of Engines and No.	Constructor.	Owner.	Trial Trip Date.	
MILITARY.																		
1	s.r.	M. IV	320	44	ft.	ft.	cu. ft.	ft.	lbs.	m. p. h.	hrs.	450	—	150	Körting	Prussian War Office	1913	
2	s.r.	M. I	243	36	51	61	213,000	—	2,750	45	—	150	2	75	Körting	Prussian War Office	1912	
3	n.r.	P. IV	275	49	61	76	355,000	8,200	7,700	42.5	15	360	2	180	Maybach	Prussian War Office	Oct., 1913	
4	n.r.	P. III	275	51	61	77	355,000	6,600	6,150	39	20	400	2	200	Körting	Luftfahrzeug Ges.	13.12.1911	
5	n.r.	P. II	253	46	56	74	284,000	6,600	4,850	30.5	20	360	2	180	Maybach	Luftfahrzeug Ges.	12.2.1913	
6	r.	S. L. II	470	60	60	72	780,000	8,200	17,300	48	24	720	4	180	Maybach	Luftschiffbau Schütte-Lanz.	28.4.14†	
7	r.	S. L. I	430	60	60	78	696,000	5,250	9,900	42.5	—	510	—	240/70	Mercedes	Prussian War Office	17.10.11†	
8	r.	Z. VIII	512	49	74*	62	780,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	31.3.1914‡	
9	r.	Z. VII	512	49	74*	62	780,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	8.1.1914	
10	r.	Z. VI	464	49	74*	62	690,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	12.11.1913	
11	r.	Z. V	464	49	74*	62	690,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	8.7.1913§	
12	r.	Z. I	464	49	74*	62	690,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	6.6.1913	
13	r.	Z. IV	464	49	74*	62	690,000	—	—	—	—	540	4	180	Maybach	Prussian War Office	14.3.1913	
14	r.	Z. III	460	46	72*	59	620,000	—	—	—	—	450	4	150	Maybach	Prussian War Office	25.4.1912	
15	r.	Z. II	485	46	72*	59	631,000	—	—	—	—	450	4	150	Maybach	Prussian War Office	20.10.1911	
NAVAL.																		
16	r.	L. 4	540	60	60	69	1,065,000	8,200	30,800	48	48	960	4	240	Mercedes	Schütte-Lanz Co.	Imperial Navy	May, 1914
17	r.	L. 3	—	—	—	62	960,000	10,000	—	—	—	720	4	180	Maybach	Schütte-Lanz Co.	Imperial Navy	20.9.1913†
18	r.	L. 2	520	55	75*	62	960,000	—	—	—	—	720	4	180	Maybach	Schütte-Lanz Co.	Imperial Navy	7.10.12‡
19	r.	L. 1	518	49	74	62	800,000	—	—	—	—	540	4	180	Maybach	Schütte-Lanz Co.	Imperial Navy	—
PRIVATE.																		
20	r.	Sachsen	464	49	74	62	692,000	6,580	—	—	—	540	4	180	Maybach	Zeppelin Co.	Delag	3.5.1913
21	r.	Hansa	485	46	72	59	665,000	6,580	—	—	—	540	4	180	Maybach	Zeppelin Co.	Delag	30.7.1912
22	r.	Viktoria Luise	485	46	72	59	665,000	6,580	—	—	—	540	4	150	Maybach	Zeppelin Co.	Delag	14.2.1912
23	n.r.	Charlotte	260	50	57	72	312,000	6,580	6,600	45.5	20	220	2	110	N.A.G.	Luftfahrzeug Gesell.	Rhein-Westfälische F. & S.	—
24	n.r.	P. L. 6	246	49	57	72	320,000	6,580	6,600	35.4	20	220	2	110	N.A.G.	Luftfahrzeug Gesell.	Rhein-Westfälische F. & S.	—
25	s.r.	Veoh I	230	41	57	72	321,000	4,900	7,600	42	20	260	4	130	Mercedes	Deutsche Luftschiffwerft	Luftfahrzeug Gesell.	30.6.1910
26	n.r.	Siemens-Schuckert	394	44	49	66	532,000	4,900	8,800	42.5	36	480	6	120	Mercedes	Siemens-Schuckert	Prussian War Office	23.1.1911
27	s.r.	L.A.G.	320	49	—	—	640,000	—	—	—	—	—	0	—	Angus	Luftschiff-Antriebs-Gesell.	Prussian War Office	—
28	n.r.	Suchard	250	56	—	—	426,000	—	—	—	—	220	—	—	N.A.G.	Metzeler-Lürssen...	Transatlantic Expedition	—

References :—r. = rigid ; s.r. = semi-rigid ; n.r. = non-rigid.

* The figure given represents the width over the outer propeller tips. Where stated the maximum attainable height represents the altitude the airship will reach with full load on board.

† In the useful load is included the weight of crew, petrol, guns and ammunition. In the column for fuel capacity the figures indicate the number of hours for which the petrol supply would last with the engines going "all out."

‡ Lost at Schneidmühl, July 17th, 1913.

§ Captured by French near Badonviller, August, 1914.

|| Wrecked in North Sea, September 9th, 1913.

‡ Destroyed by French near Badonviller, August, 1914.

§ Captured by Russians, September, 1914.

†† Severely damaged by Russians, August 28th, 1914.

|| 18½ hours voyage

References:—r. = rigid; s.r. = semi-rigid; n.r. = non-rigid.

* The figure given represents the width over the outer propeller tips. Where stated the maximum attainable height represents the altitude the airship will reach with full load on board. In the useful load is included the weight of crew, petrol, guns and ammunition. In the column for fuel capacity the figures indicate the number of hours for which the petrol supply would last with the engines going "all out."

† Lost at Schneidemühl, July 17th, 1913.

‡ Destroyed by French near Badonville, August, 1914.

§ Captured by Russians, September, 1914.

|| 18½ hours voyage.

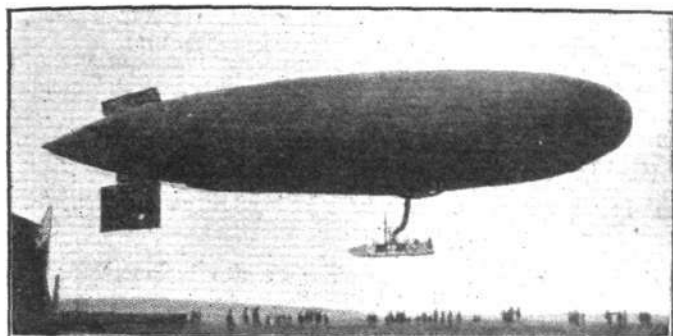
‡ Severely damaged by Russians, August 28th, 1914.

aluminium, of which metal the framework of the rigid structure preserving the shape of the envelope is made. Internally the structure is divided into from 15 to 20 compartments, each of which contains a small balloon.

These balloons are independent of one another, so that should one or more of them become pierced by a bullet or by some other cause, the remaining gas chambers would still possess sufficient buoyancy to keep the airship afloat for a considerable length of time. Immediately below the main hull of the Zeppelins is a keel which, like the rest of the cigar-shaped body, is enclosed by an outer covering of fabric. Approximately half way along the entire length of the airship the keel is swelled out to form a main cabin in which are accommodated the crew (except the engine crew, who are placed in the two cars containing the engines), bombs, ammunition, &c. The two cars referred to above are placed about a fourth of the length from the nose and bow of the dirigible, and are in communication with the central cabin by a passage inside the enclosed keel.

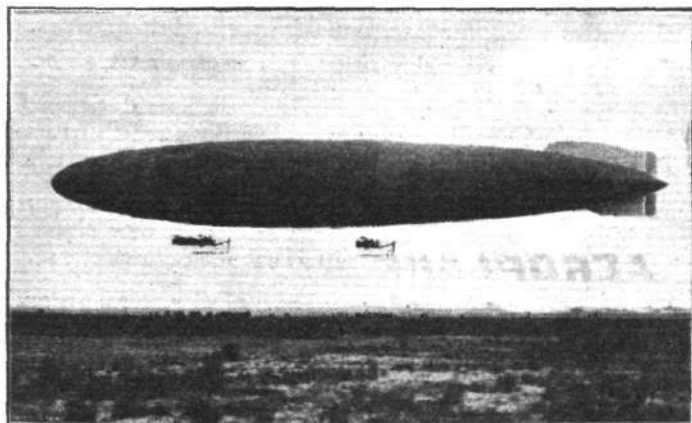
The propellers—usually four in number—are supported on a structure of steel tubes sloping outwards and downwards from the sides of the hull. They are driven by the engines placed in the front and rear car through bevel

gearing. A portion of the structure carrying the propellers is usually enclosed in fabric, probably in order to damp out any rolling movement that may be set up, thus performing a function similar to that of the bilge keels on a ship. At the rear are carried the tail planes, which consist of a series of vertical and horizontal movable surfaces hinged to form rudders and elevators, and of another series of fixed horizontal and vertical surfaces performing the duty of fins or stabilizing planes.



5. The Army Airship Ersatz P II.

Of the other airships belonging to the rigid type the most successful and best known is the Schütte-Lanz, which resembles the Zeppelin in outward appearance, with the exception that the hull is of streamline form and not as in the case of the Zeppelin straight-sided. Constructionally the Schütte-Lanz differs from the Zeppelin in that the framework is not built of aluminium as in the former, but is constructed throughout of three-ply and multi-ply wood. This form of construction is somewhat heavier than aluminium, and the useful load of the Schütte-Lanz is therefore comparatively smaller than that of the Zeppelins. Apart from constructional and other divergencies, the disposition of the cars differs from



7. The Army Airship S. L. I.

Zeppelin practice in that whereas in the former the cars are placed close beneath the keel, they are in the Schütte-Lanz placed some distance below the hull. In the Schütte-Lanz II there are four cars, distributed in the following manner: Approximately amidships are mounted two cars side by side, and so far apart as the diameter of the envelope. A short distance behind these two cars,

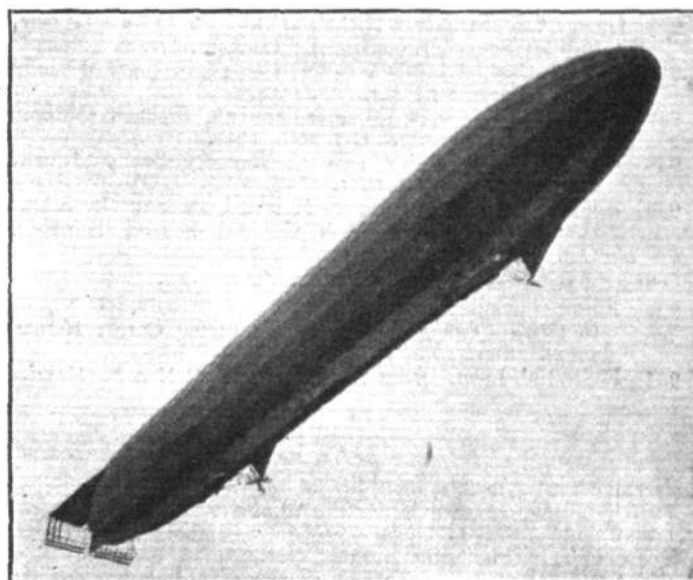


Further Trials with Langley Aeroplane.

AFTER the tests with the Langley monoplane, made by Mr. Glenn Curtiss some months ago, the machine was put aside, as time could not be spared for further experiments. It was, however, brought out again on September 19th, having in the interval been fitted with a

but under the centre line of the envelope, is placed a third car, whilst near the nose of the airship is a fourth car, also centrally mounted. Immediately in front of the last-mentioned car is an enclosed cabin providing accommodation for the navigating crew. Each of the four cars contains a 180 h.p. Maybach engine driving a single two-bladed propeller, and the mechanics in charge of the engines are also, of course, accommodated in these cars. The tail planes are of a somewhat simpler type than are those of the Zeppelins, the vertical and horizontal planes being symmetrical and consisting of single planes instead of the superimposed planes of the Zeppelins. Owing to the better stream-line form of the hull of the Schütte-Lanz, these are probably faster, other things being equal, than the Zeppelins. As against this advantage must be counted the greater weight of the wood construction, which renders the ratio of the useful load to the weight of the airship smaller in the case of the S.L. than in the Zeppelins.

The most successful representatives of the semi-rigid airship type are those built by the Prussian War Office,



11. The Army Airship Z V.

and designed by Major Gross, which are known officially as the "M" class. This type is a combination of the rigid and the non-rigid types, in so far as it has a supple gas bag of stream-line form, with a rigid keel built of steel tubes running along the bottom. From this keel is slung the car accommodating the engine and crew.

The third and last of the three airship types is represented by the Parseval airship, which is characterised by a supple envelope, from which the car is slung without the intermediary of a rigid keel by means of ropes passing over the envelope. Although in size and speed these little airships cannot compare with the representative of the rigid type, they are nevertheless very useful for certain purposes, and possess the advantage that no great elaborate sheds are required in which to keep them, as they can be easily deflated and again inflated in almost any sheltered spot. (To be continued.)



90 h.p. Curtiss motor in place of its original engine. Slight modifications had also been made in the setting of the planes, the angle of incidence being reduced to ten degrees, and in the position of the floats. Piloted by Elwood Dougherty, it flew for 1,000 yards and then, after planing down to the water, for another 800 yards.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Special Committee Meeting.

A SPECIAL MEETING of the Committee was held on Tuesday, the 20th inst., when there were present:—Prof. A. K. Huntington, in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. C. F. Pollock, and the Assistant Secretary.

Aviators' Certificates.—The following Aviators' Certificates were confirmed:—

- 925 Flight Sub-Lieut. Philip Charles Vere Perry, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Oct. 5th, 1914.
- 926 Thomas Walker Abbott (Caudron Biplane, British Caudron School, Hendon). Oct. 7th, 1914.
- 927 Peter Legh (Caudron Biplane, British Caudron School, Hendon). Oct. 8th, 1914.
- 928 Malcolm McBean Bell-Irving (Maurice Farman Biplane, Military School, Brooklands). Oct. 9th, 1914.
- 929 George Crossfield Norris Nicholson (Maurice Farman Biplane, Military School, Brooklands). Oct. 9th, 1914.
- 930 Donald Campbell MacLachlan (Wright Biplane, Beatty School, Hendon). Oct. 9th, 1914.
- 931 Beaufoi John Moore (Maurice Farman Biplane, Military School, Brooklands). Oct. 10th, 1914.
- 932 Rupert Forbes-Bentley (Wright Biplane, Beatty School, Hendon). Oct. 8th, 1914.
- 933 Flight Sub-Lieut. Edwin Rowland Moon, R.N.A.S. (Caudron Biplane, British Caudron School, Hendon). Oct. 10th, 1914.

The following Aviators' Certificates were granted:—

- 934 Flight Sub-Lieut. Kenneth Stevens Savory, R.N.A.S. (Maurice Farman Biplane, Royal Flying Corps, Netheravon). Sept. 29th, 1914.
- 935 Flight Sub-Lieut. David Keith Johnston, R.N.A.S. (Maurice

- Farman Biplane, Royal Flying Corps, Netheravon). Oct. 1st, 1914.
- 936 Flight Sub-Lieut. Vincent Nicholl, R.N.A.S. (E.A.C. Biplane, Eastbourne School, Eastbourne). Oct. 8th, 1914.
- 937 Flight Sub-Lieut. Francis Gilmer Tempest Dawson, R.N.A.S. (E.A.C. Biplane, Eastbourne School, Eastbourne). Oct. 8th, 1914.
- 938 Flight Sub-Lieut. Maurice Edward Arthur Wright, R.N.A.S. (E.A.C. Biplane, Eastbourne School, Eastbourne). Oct. 8th, 1914.
- 939 Flight Sub-Lieut. Edward Gordon Riggall, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Oct. 11th, 1914.
- 940 Ormond George Hake (Maurice Farman Biplane, Military School, Brooklands). Oct. 15th, 1914.
- 941 Capt. Thomas Walter Colby Carthew (4th Bedfordshire Regiment) (Maurice Farman Biplane, Central Flying School, Netheravon). Oct. 16th, 1914.

Notice to Members.—The question as to what action should be taken in regard to Members of the Club who are alien enemies was considered, and it was decided that the following notice be put up in the Club:—

"Members who are subjects of States at War with His Majesty are not permitted to use the Club during the continuance of the War."

Royal Aero Club Burgee.

Burgees, embodying the design recently approved by His Majesty the King, namely the Royal Crown with the Caduceus, can now be obtained by Members from the Royal Aero Club, price 6s. each.

B. STEVENSON, Assistant Secretary.

166, Piccadilly, W.

THE BRITISH AIR SERVICES.

Royal Naval Air Service.

THE following was announced by the Admiralty on the 15th inst.:—Staff Surgeon P. T. Nicholls, to the "Pembroke," additional, for Isle of Grain Flying Station, temporarily. October 14th.

The following were announced by the Admiralty on the 19th inst.:—

Flight Sub-Lieut. (temporary) T. W. Elsdon, to the "Pembroke," additional, for Calshot Naval Air Station, as acting Flight Lieut. October 16th.

Probationary Flight Sub-Lieuts. A. R. Arnold and P. L. Holmes confirmed in the rank of Flight Lieuts., with seniority of August 1st, and both appointed to the "Pembroke," additional, for Royal Naval Air Service, to date October 5th and 12th respectively; W. H. S. Garnett, confirmed in the rank of Flight Lieut., with seniority of August 14th, and appointed to the "Pembroke," additional, for Royal Naval Air Service. October 12th.

Edward J. Cooper has been entered as Probationary Flight Sub-Lieut., and appointed to the "Pembroke III," for course of instruction at Hendon Air Station. October 17th.

The following was announced in the *London Gazette* of the 20th inst.:—

The undermentioned probationary Flight Sub-Lieutenants have been confirmed as Flight Sub-Lieutenants: Anthony Rex Arnold. Dated August 1st, 1914. Philip Leslie Holmes. Dated August 1st, 1914. Walter Hugh Stewart Garnett. Dated August 14th, 1914.

Royal Flying Corps (Military Wing).

The following appeared in a supplement to the *London Gazette* issued on the 15th inst.:—

Sec. Lieut. Loftus A. Bryan, Special Reserve of Officers, South Irish Horse, is seconded for duty with the Royal Flying Corps, Military Wing: August 4th, 1914. Sec. Lieut. Loftus A. Bryan to be Lieut., under the provisions of paragraph 105, Regulations for Officers of the Special Reserve: May 10th, 1914.

Supplementary to Regular Corps.—Sec. Lieuts. to be Lieuts.: September 16th, 1914, Arthur L. Russell and Denys C. Ware.

The following appeared in the *London Gazette* issued on the 16th inst.:—

Capt. Basil H. Barrington-Kennett, Grenadier Guards, employed with Military Wing, Royal Flying Corps, to be Brevet Major. Dated August 22nd, 1914.

Sec. Lieut. F. C. Jenkins, Royal Flying Corps, Special Reserve, to be temporary Capt. Dated September 7th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 19th inst.:—

The undermentioned temporary appointments are made at the War Office: Capt. John T. Dreyer, Royal Artillery, to be a Deputy Assistant Director and to be temporary Major whilst so employed, vice Capt. (temporary Major) H. Musgrave.

Quartermaster and Honorary Lieut. Thomas Lyons, Royal Flying Corps, to be a Staff Capt. at the War Office temporarily. Dated September 15th.

The undermentioned to be Flying Officers. Dated October 3rd, 1914: *Capt. John F. A. Kane, the Devonshire Regiment; *Capt. Arthur D. Gaye, the Bedfordshire Regiment; *Lieut. John L. Kinnear, The King's (Liverpool Regiment); *Lieut. James D. G. Sanders, Royal Artillery; *Lieut. Evelyn P. Graves, Royal Artillery; *Lieut. Henry G. L. Mayne, The King's Own Scottish Borderers; *Sec. Lieut. Dermot R. Hanlon, Royal Artillery; *Lieut. Gerald D. Mills, The Sherwood Foresters (Nottinghamshire and Derbyshire Regiment); Lieut. Lanoe G. Hawker, Royal Engineers; and *Lieut. Gerald G. Carpenter, The Suffolk Regiment.

Lieut. C. F. Lee, West Somerset Yeomanry, to be a Flying Officer. Dated September 2nd, 1914.

Lieut. C. F. Lee, West Somerset Yeomanry, a Flying Officer, to be Adjutant with the temporary rank of Captain whilst so employed, vice Capt. R. Pigot, The Rifle Brigade (The Prince Consort's Own). Dated September 24th, 1914.

The following was announced in the *London Gazette* of the 20th inst.:—

The undermentioned Second Lieutenants (on probation) resign their commissions. Dated October 21st, 1914: John G. Miller and Reginald Chambers.

*To be seconded.

THE NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.

It is officially announced that the Army Council have decided, on the recommendation of the Judges' Committee, to make the following awards:—

The prize of £5,000 to the Green Engine Co. for the Green 100 h.p. water-cooled engine No. 1, which best fulfilled the requirements of the competition and possessed the greatest percentage of attributes desirable in an aeroplane engine.

Awards of £100 for each engine to the under-mentioned firms in respect of the engines entered by

them which performed successfully the eliminating trial of a six hours continuous run at full power:—

	£
Argylls, Ltd.	100
Beardmore Austro-Daimler Engine Co. ...	200
British Anzani Engine Co.	100
Dudbridge Ironworks Co.	300
Gnome Engine Co.	200
Green Engine Co.	100
Sunbeam Motor Car Co.	100
Wolseley Tool and Motor Car Co.	200

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

Naval Flying.—There was not so much flying last week owing to the very windy weather, though the greater number of the machines were out for instructional purposes when possible.

The machines up were: 2 Maurice Farman's, Vickers gun 'bus, and 2, 63, 66, 152 Shorts, and Deperdussin.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Sunday, last week, Flight Sub-Lieuts. Allen, England, Ffield, Groves, Hodsell, Price and Messrs. Greenwood and Stalker straights with Instructors Manton, Russell, Winter and Shepherd. Flight Sub-Lieut. Young (new pupil) rolling with Instructor Shepherd. Mr. Carabajal solo circuits and Flight Sub-Lieut. Riggall going in for and passing excellently his *brevet* tests.

On Monday, Flight Sub-Lieuts. Allen, England, Ffield, Groves, Hart, Hodell, Price, Young, Messrs. Greenwood and Stalker straights with Instructors Manton, Russell, Shepherd and Winter. Mr. Carabajal solo straights and half circuits. Mr. Easter ditto. Flight Sub-Lieut. Morgan straights and circuits with instructor and afterwards alone.

Tuesday, Flight Sub-Lieut. Bray (new pupil) rolling. Ffield and Mr. Greenwood straights with Instructors Winter and Shepherd. Flight Sub-Lieut. England and Mr. Easter solo straights and half circuits.

Wednesday, Flight Sub-Lieuts. Bray, Groves, Hodsell, Young, and Mr. Y. Y. Liu straights with Instructors Russell, Shepherd, and Winter. Flight Sub-Lieut. Watson (new pupil) rolling with Instructor Shepherd. Flight Sub-Lieut. England solo circuits.

Thursday, Flight Sub-Lieuts. Allen, Bray, Ffield, Groves, Hodsell, Price, Watson, Young, and Mr. Greenwood straights with Instructors Winter, Manton, Shepherd, and Russell. Sub-Lieut. Allen afterwards solo straights. Flight Sub-Lieut. England and Messrs. Carabajal and Easter solo circuits.

The rest of week too windy for flying; pupils keep to hangars.

Beatty School.—Last week, pupils being instructed on "dual"-controlled machines. Instructors: Messrs. Geo. W. Beatty and Roche-Kelly. Instruction given during the week to Messrs. Leong (5), Virgilio, Gardner, Aoyang, Parker, Whitehead, Jenkinson, Fletcher, Leeston-Smith, Beynon, Moore, Le Vey, Christie and Donald.

British Caudron School.—On Monday, last week, the Caudron school was out at 8 a.m. Instructors during week R. Desoutter and R. M. Murray. R. Desoutter trial flight. Dr. Christie half circuits. Messrs Barfield and Stevens doing straights. Mr. Beynon rolling. Probationary Sub-Lieuts. Tench and Bird rolling. Evening,

school out at 4.30 p.m. Probationary Sub-Lieuts. Bird and Tench rolling practice. Messrs Gunner and Beynon rolling. Messrs Christie and Ivermee half circuits.

Tuesday and Wednesday, weather too bad for school work.

Thursday morning, windy; evening, Mr. Ivermee doing circuits, nearly ready for ticket. Mr. Barfield straights. Mr. Beynon rolling, Lieuts. Bird and Tench rolling practice. Dr. Christie half circuits.

Friday and Saturday, very windy.

Hall School.—Sunday, last week, Brynildsen and Roe six good straight flights each. J. L. Hall four circuits on *brevet* tractor.



Lieut. F. Polehampton, who passed for his *brevet* tests at the Grahame-White Aviation School, Hendon, on September 27th.

Monday, J. Rose three good circuits at 60 ft. and eight straight flights, followed by E. Brynildsen eight straight flights and two circuits.

Tuesday, too windy for practice. Wednesday, J. L. Hall out on *brevet* tractor. Thursday, windy in morning. In evening, J. L. Hall 1,000 ft. on *brevet* 'bus, testing for J. Rose.

Friday and Saturday, gale blowing. On latter day, new pupil, Lloyd Williams (of Old Public School's Corps, Epsom), joins school. Two new school machines now well advanced in construction.

BRITAIN'S AERONAUTICAL INDUSTRY.

THE magnificent effort that has been made by the aeronautical industry in this country, to cope with the sudden demand for an increased output of machines, spare parts and accessories, that followed immediately upon the outbreak of hostilities, is one of the most gratifying features of the war. Difficulties associated with the adequate provision of skilled and experienced workmen, together with those which arise from the cutting off of all supplies from Continental sources, have been sur-

mounted in a remarkable manner; and the fact that everything has progressed so smoothly and quietly bears ample witness to the excellence of the organisation and the business ability of those who are responsible for the management of the different undertakings.

Under these circumstances, we believe that a description of the various aeronautical works throughout the country will prove of more than passing interest to our readers, and this week we, therefore, commence the series with:—

THE AIRCRAFT MANUFACTURING COMPANY'S WORKS AT HENDON.

The Aircraft Manufacturing Co. occupy a position in the aeronautical industry of this country that, in one respect, is peculiar to themselves. In entering upon the manufacture of aeroplanes, there are two courses open to a prospective constructor—either he may undertake the manufacture of a machine with an established reputation, or he may strike out on a line of his own and evolve a more or less new design.

The aeronautical engineer who chooses to adopt the latter procedure deserves every encouragement for his enterprise, as along that road very often lies progress; but, given the soundest design, for its complete success it is almost a *sine quâ non* that there should be ample financial reserves available for the support of the scheme, as the experimental work involved in perfecting the design may necessitate the expenditure of an enormous amount of capital before there is any adequate return.

Such, however, is not the case where the aeroplanes which it is proposed to manufacture are replicas of those that have already been shown to possess practical merit; and this advantage was appreciated by Mr. Holt Thomas when he commenced building in Great Britain the machines designed by Henry and by Maurice Farman. At first, he purchased the Farman aeroplanes in France, at the same time manufacturing all spare parts, and building on a small scale in this country; but as matters progressed, he, later on, founded the Aircraft Manufacturing Co., and eventually commenced constructing both the Henry and the Maurice Farman aeroplanes at Merton. The continued growth of business, however, and the desirability of closer proximity to a large flying ground, together with the prospective use of the Merton works for other purposes in connection with airship construction, led to the taking of the larger and more convenient premises in Collindale Avenue, Hendon, where the Aircraft Company's factory is now located.

In many respects this site is an ideal one for an aeroplane works. Its proximity to the London Aerodrome renders it unnecessary to devote special attention to the packing of the various parts of aeroplanes in cases before transporting them by road to the company's sheds at the aerodrome for final erection; in fact, many parts are carried over by hand. In addition, there is ample room for extension, when such becomes necessary, and for housing accommodation for the workmen. Difficulties which at present exist in connection with the latter, owing to the dearth of suitable dwellings in the district and which has become accentuated with the sudden increase in the staff employed, will shortly be entirely eliminated, as over 100 cottages are to be erected in the vicinity. As indicating the interest which is being taken by the firm in the comfort of their employees, it may be mentioned that the company have guaranteed the payment of the rent of these houses to the builders.

The manufacturing premises, which were originally intended for and, for some time, were actually used by the Metropolitan Electric Tramways Co. as a garage for their motor omnibuses, form what is probably one of the largest private aeroplane works in the country. The total available floor space is nearly 50,000 square feet, and if account is taken of the gallery which has been erected at the far end of the middle bay in order to provide additional accommodation, this area is exceeded. The building has three bays, each of which is of sufficient width to permit of the erection and handling of the largest machines under manufacture without undue cramping, although at the present time only the centre bay is used for this purpose. To the right, on entering the building, are the metal fitting and the machine shops, which are well equipped with machine tools of various kinds, welding and brazing plants, &c., the stores for the finished parts as well as ready-use stores, and the offices for the drawing and the clerical staffs. On the extreme left, near the entrance to the works, are the wood-working machine shops where a large number of circular and band saw and planing machines are installed. Lower down, on the same side, are the two *nacelle* shops, which are completely screened off from the rest of the building, as the manufacture of these parts of the Henry and Maurice Farman aeroplanes are kept quite separate and distinct. The remainder of

this left-hand bay, as well as the gallery, is devoted to the wood working shops.

The excellent lighting arrangements available can be seen from our page of illustrations, as in addition to the windows, which are placed well up in the four walls of the building, there are three splendid top lights running the full length of each bay; while adequate provision has been made for lighting the building by electricity during such times as artificial light is necessary. Special reference must also be made to the heating system which has been installed, as the problem of maintaining an equable temperature during the summer as well as during the winter months is by no means an easy one. The difficulties have, however, been entirely overcome by the fitting of the Sturtevant system of heating, in which air is forced by an electric fan through conduits which are led to every part of the building. In the winter the air is heated before distribution through the system, by passing it through coils in a furnace, whilst, in hot weather, the air is cooled by artificial means before admission to the building. The provision of ample lighting facilities and the maintenance of a uniform temperature in the shops are sometimes regarded as luxuries; but, in reality, they have a most important bearing upon the physical condition of the men, and as such are reflected in the quality and the quantity of work which is turned out of the factory.

Under normal conditions, practically every operation performed in the manufacture of the Henry and the Maurice Farman aeroplanes is done upon the premises, even to the nickel plating of clips, metal fittings, &c., on the Maurice Farman, for which purpose a special plating plant has been installed at the end of the metal fitting shop. Such a system is, without doubt, highly desirable, since it ensures the attainment of a uniform standard of workmanship in every part of the machines which it would be almost impossible to reach by any system of inspection; and there is little doubt that it is in part responsible for the exceptional finish of the Aircraft Company's products, which is one of their many outstanding excellent features. At the present time, however, in the rush of work which is now passing through the factory, the manufacture of various metal fittings, which can be made just as well outside, has been placed with certain reliable firms; but on delivery at the works, each part is subjected to a close examination, not only by the Government inspectors, but also by the representatives of the Aircraft Company. In every case, the finishing operations are done upon the premises.

The number of men employed by the Company at their works at Hendon at the present moment, including those who have been taken on recently, is about eight hundred, besides whom there are a few boys who are principally engaged in finishing off certain parts. Many of the recent additions to the staff were men who, although thoroughly skilled workmen, had had no previous experience in aeroplane construction; so in order that the Company's products might not suffer in any way, these men have been drafted into gangs, over each of which an experienced and tried workman has been appointed as leading hand, who is held responsible that the work turned out by the men under his control is conscientiously done, and in accordance with the Company's traditions. By this means it has been possible to avoid working the men in night and day shifts in the woodworking departments, although in the case of the machine shops, owing to the desirability of limiting the capital outlay on new machine tools, it has been necessary to do so.

In the past the Aircraft Co. has followed the somewhat conservative policy of keeping strictly to the designs of the Farman, and subsequent events have proved that policy to have been a sound one, not only from a business point of view, but in its national aspect. As our readers are, however, aware, the Company is now engaged upon the manufacture of an aeroplane of the propeller type from the designs of Mr. G. de Havilland, who joined the firm some time ago. Unfortunately, from the standpoint of the Aircraft Co., the services of Mr. de Havilland were requisitioned by the War Office on the outbreak of war; but we are glad to hear that the manufacture of the machine is now proceeding favourably, and we hope to hear more of it in the immediate future.

BRITAIN'S AERONAUTICAL INDUSTRY.



THE AIRCRAFT MANUFACTURING COMPANY'S WORKS AT HENDON.

THE 120 H.P. GREEN ENGINE.

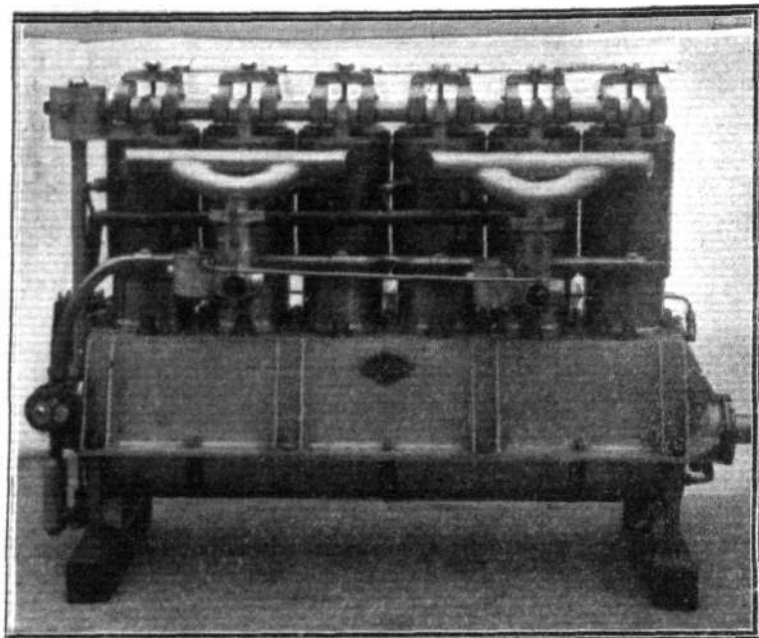
THE WINNER OF THE NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.

ELSEWHERE in this issue we comment upon the latest achievement of the Green Engine Co. in winning the £5,000 prize offered by the War Office in connection with the Naval and Military Aeroplane Engine Competition, the regulations governing which were published in *FLIGHT* for the 14th June, 1913. The success is all the

our readers are, therefore, familiar with their general construction. It may, however, be mentioned that the engine has a bore and stroke of 140 mm. and 152 mm. respectively, weighs 440 lbs. complete, and develops its rated horse-power at a speed of 1,250 revs. per min. The essential features of the design are: The copper jackets, with their special rubber joints at the bottom ends, to allow for the difference in the expansion of copper and steel; the overhead enclosed valve gear, which by rotating the casing about the cam-shaft permits of ready access to the valves for examination or grinding in; the neat compact arrangement of the driving gear for the magneto, and the water and oil pumps; the employment of a fully forced system of lubrication to all bearings, and the provision of a bearing between each crank throw.

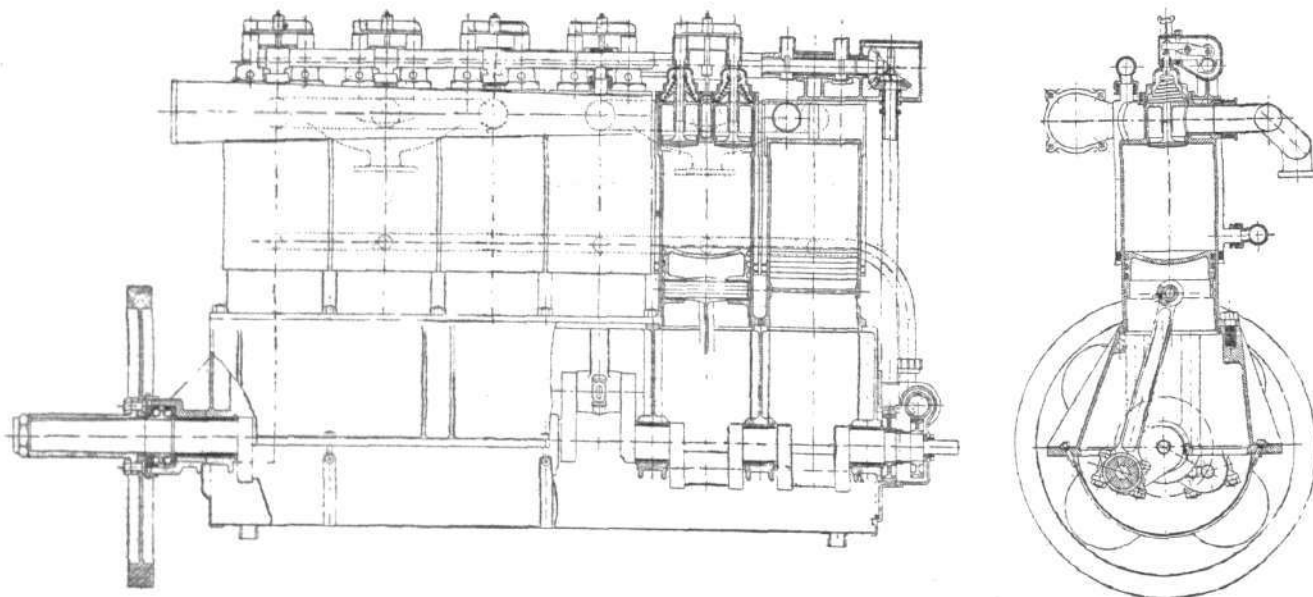
Since this engine, which is an improvement on the old 100 h.p., was first placed upon the market, it has undergone no radical change in design, such alterations which have been made having had as their object increased reliability and power and decreased vibration. To this end, the crankshaft has been stiffened up, the reciprocating parts have been lightened, and a special hot-air intake has been fitted, which draws air from around the uncorked portion of the cylinders, thus conducing to more effective lubrication and efficiency.

The Green was the third lightest amongst the water-cooled engines in the Competition, only those entered by the Dudbridge Ironworks and by the Sunbeam Motor Car Co. having a higher power weight ratio. Economy in the consumption of fuel and oil has always been a marked quality of the Green engines, as the performances of the engines in previous engine competitions and in the Military Aeroplane Trials of 1912 testified, and is, no doubt, largely due to the very effective system of lubrica-



The 120 h.p. Green engine.

more creditable when it is recalled that on two previous occasions Green engines have secured highest awards in open competitions. All these successful engines were designed on somewhat similar lines, but the 30-35 and the 60-70 h.p. engines, which won the Patrick Alexander Competitions of 1910 and 1911 respectively, are of the



THE 120 H.P. GREEN ENGINE.—Side and end sectional elevations.

four-cylinder vertical type, whilst the 120 h.p. engine is a six-cylinder vertical motor.

Full detailed descriptions of the 120 h.p. Green engine have appeared in these pages from time to time,* and

* See *FLIGHT* for March 14th and 21st and April 25th, 1914.

tion and carburation employed; a Zenith carburetter is fitted. The construction embodied in the valve gear, the method of supporting the crankshaft and the forced system of lubrication also conduce to a silent, smooth running engine, and together with light reciprocating parts

give greater reliability and durability. Accessibility is an important feature of these engines, as in addition to the freedom of access to the valves, which has already been referred to, the interior of the crankcase can be quickly exposed by unscrewing three nuts. In fact, the general design, which is the result of years of development and accumulated experience, is such as to conform naturally in many respects to the qualities that were specified in the rules of the competition as desirable, notably in regard to simplicity of construction, minimum head resistance and convenience of fitting, as well as those previously mentioned.

In the course of the tests, which were of an extremely exhaustive character, the Green engine ran for a period of over 62 hours without an involuntary stop, developing

between 102 and 103 b.h.p., a performance which must be regarded in the nature of a record for, at least, officially observed engine tests. The Green Engine Company are therefore to be sincerely congratulated upon their fine achievement.

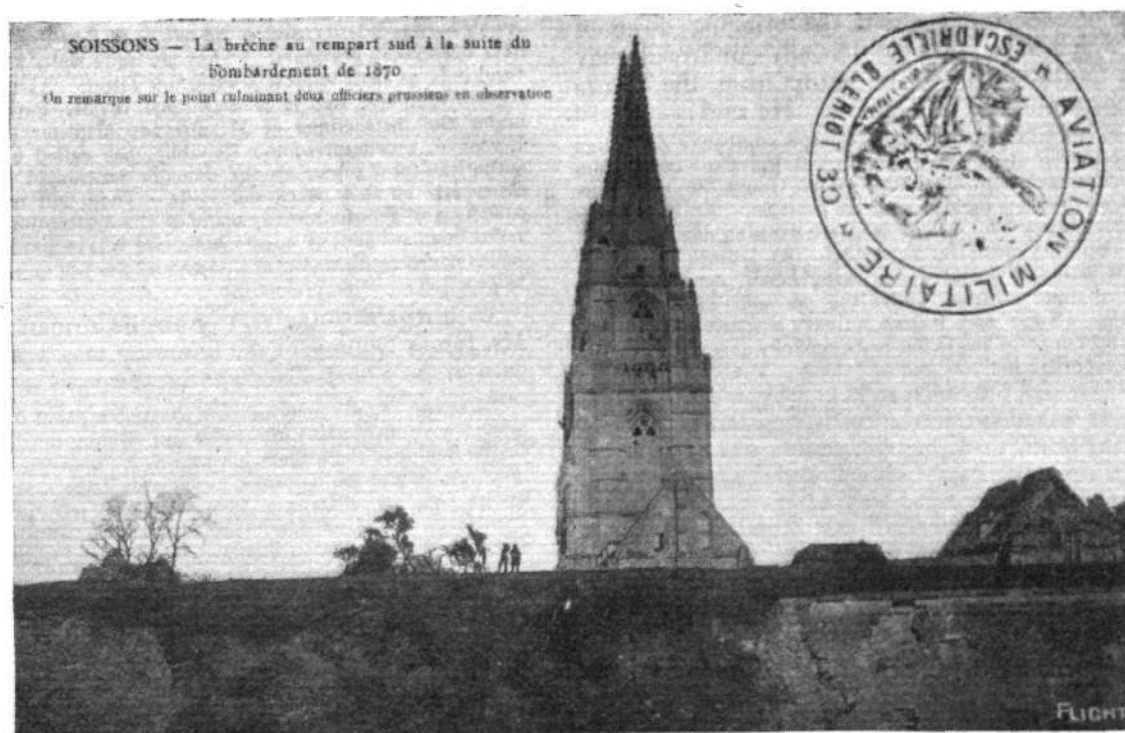
The detailed results of the trials are, at the present moment, not available, but no doubt, in due course, such information will be made public. Interest in a competition of this character is naturally centred upon the performance of the winner; but the fund of information relating to engine design that cannot fail to have been accumulated as the result of the competitions should be of value to present and future designers, and as such is too valuable to lose, since the lessons to be drawn from it will react beneficially upon the whole aeronautical industry.

EDDIES.

A VERY welcome proof to his many friends here that the story of the accident to Louis Noel had been exaggerated is to hand in the shape of the post card which I am reproducing for the benefit of FLIGHT readers. Writing from Soissons, under date of October 14th, Noel says:—"A few lines only to say you, we are all well. I should like to write you many things about the war, but it is not possible now. When we have bad weather we go down in the trenches and take part in the engagement. I am sure as always, that the final victory of our armies is nearer than many people think, so.—Yours very sincerely, LOUIS NOEL."

Curiously enough, by the same post which brought Noel's post card there arrived a letter from a friend who is at present at the front (near Ypres) in which he informs us that Mr. Noel is a long way off being dead. My correspondent also mentions that he learns that Chevillard, Joubert, and Masson are prisoners with the Germans, and goes on to tell the following story, which he has

heard on good authority: "Joubert was captured by the Germans, probably having had to come down on account of engine trouble. By some strange coincidence, which the Germans lost no time in taking advantage of, one of the German officers bore a most striking resemblance to Joubert. This officer was dressed in Joubert's clothes, and given his papers, and succeeded, partly on account of his likeness to the French aviator and partly because of his excellent French, in reaching Paris by motor car. Arrived there, he boldly entered the French Aero Club without being detected, and after eliciting all the information he could from the unsuspecting French aviators gathered there, he proceeded to learn still more, and visited two aeroplane factories. Here again all went well, probably because he had the luck not to meet any of Joubert's personal friends, in which case he would hardly have escaped detection. Made bold by his successes, the German paid a visit to the Gnome works, where he was just getting on swimmingly learning 'all about it' when he was spotted by a mechanic who knew



The above postcard, just received from Louis Noel, under date October 14th, once and for all disposes of any doubt as to his being in the world of the living. The view in the picture is a reminiscence of the War of 1870, and shows Soissons after the bombardment in that year.

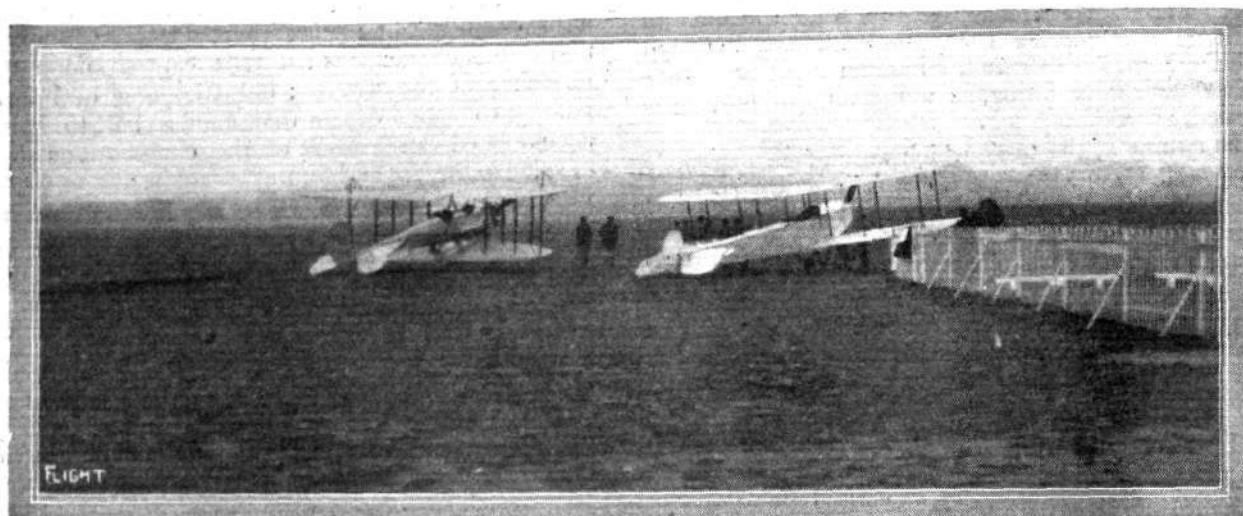
Joubert. His fate after that I do not know." At any rate, if it only half really happened, he must have been—as my correspondent puts it—some spy!

x x x

In addition to the two Caudron type biplanes already in use the Hall School at Hendon will soon have a

Apropos of Noel's accident, Capitaine Oswald Watt, who, it will be remembered, is in command of the French escadrille of Blériots, one of which Noel is piloting, sends the following quotation from l'ordre de l'armée, Paris, Sept. 23:—

"10°. Le soldat pilote Noël bien que blessé sérieusement dans un accident d'automobile a refusé de sa faire



The Handley-Page and Avro biplanes ready to take the air at Hendon.

third machine of the "pusher" type, the construction of which has been commenced at Mr. Hall's works at Edgware. The new machine will be of quite small dimensions, and will not be fitted with a front elevator. The pilot will be seated in a small nacelle projecting out in front of the main planes. It is not yet definitely decided what engine will be fitted, but it is probable that a 50 Gnome will be chosen. A machine of this type should be a valuable addition to the Hall "stable," and add to the popularity of this school.

porter malade et est parti le soir même pour une mission dangereuse.—(Signed) GALLIÉNI."

x x x

In a footnote Captain Watt says that there were rumours of a Zeppelin over Paris, and Noel went after it in his two-seater Blériot. The motor-smash referred to is, in all probability, the one of which Noel spoke in a letter to us dated September 9th, and the Zeppelin chase in the dark must have taken place the next evening. Well, we all knew that Noel is a plucky 'un. "ÆOLUS."

⊗ ⊗ ⊗ ⊗

AIRCRAFT AND THE WAR.

THAT some of the stories about the bringing down of Zeppelins, which have not been officially confirmed, may be true is indicated by a telegram from the *Daily Chronicle* correspondent at Geneva. He said:—

"In spite of official German denials, a large number of Zeppelins have been destroyed since the beginning of the war—two by the English aviators' raid on Düsseldorf—and Count Zeppelin has received orders to replace them as soon as possible. At Friedrichshafen a double "crew" of skilled men are working day and night to complete two very powerful Zeppelins. At Düsseldorf and at Hamburg new works, it is stated, are being hastily constructed for the building of more airships, under the personal supervision of Count Zeppelin. Swiss and Italian military authorities, however, declare that the Zeppelin has failed in its capacity as a scout; while its bomb-throwing has had no military effect. The less expensive aeroplanes have proved very useful so far in the war."

The matter was also referred to by the *Daily Call* correspondent as follows:—

"For the past fortnight Count Zeppelin has been paying flying visits to Friedrichshafen (across the Swiss frontier from Constance), supervising the construction of the two new Zeppelins, which will be ready shortly, as work on them is continuing night and day and the staff of men has been doubled. Yesterday the Count acted as guide to a number of German wounded soldiers, and showed them the works in detail. Any foreigner approaching the sheds is promptly arrested. The engineers and workmen are openly boasting that the more powerful new Zeppelin, which 'can remain in the air indefinitely,' is meant for a raid on London."

Writing from Paris last week, Mr. Ernest Smith, in the *Daily News*, said:—

"Attached to one of the bombs which fell in Paris on Monday (12th inst.)—the aviator signing his name Hans Steffen, Lieutenant

Aviator—was a letter giving the names of four French officers who have been taken prisoners. 'They are quite well,' says the aviator, 'and it is at their request I write this letter. As to the bombs, I regret infinitely, but it is war. Au revoir, Parisians.' Acting under the instructions of M. Briand, Minister of Justice, M. Lescouvé, procureur of the Republic, has called upon the police authorities for a report on the damage occasioned by the German aeroplanes on their week-end visits. They will be added to the collection of reports already made of the destruction caused by the aerial bombardment of open towns, and will be produced when the Allies come to discuss peace terms and the bill Germany will have to pay."

With regard to the visit of hostile airman to Karlsruhe, Mr. James Dunn sent the following message from Rotterdam to the *Daily Telegraph* on the 15th inst:—

"German reports received here to-day state that it was an English airman who on Monday afternoon and evening flew over Karlsruhe. Just before dusk the airman hovered over the arsenal, the ammunition factory, and the barracks, causing excitement and alarm among troops and the citizens. The aeroplane left unscathed. Two French airmen also flew over Karlsruhe. One went over the Zeppelin sheds at Baden-Baden. He was fired on without effect."

It was reported from Paris on the 15th that an aeroplane easily recognised to be of German make, having been reported from Coulommiers as flying towards Paris, was immediately pursued, and promptly disappeared.

A correspondent of the *Times* at Petrograd, on the 16th inst. wrote:—

"It is reported from Warsaw that the appearance of German aeroplanes over the city and the neighbourhood has become an ordinary phenomenon and has ceased to cause serious alarm. On

October 10th, Russian gunners brought down a couple which threw out bombs. Cossacks slew the crew of one and captured the crew of the other."

Having been delayed in transmission apparently, the following message, dated Nancy, October 13th, was published in the *Times* of the 17th inst. :—

"This morning, for the second time since the beginning of the war, the inhabitants of Nancy had the fleeting excitement of a visit from a Taube monoplane, which was followed a few minutes later by a biplane, also a German. Flying over the centre of the town, from south-east to north-west, the leader dropped three bombs over the goods station of the Compagnie de l'Est from a height of about 1,500 yds. The first bomb fell on one of the station buildings, used for storing old barrels, the second on the footboard of a first-class carriage, and the third on the permanent way, where it did a certain amount of damage to one of the rails. There were also four human victims, though fortunately none of them was seriously hurt—a boy of 18, superficially wounded in the head, a railway employee, whose back was injured, and two children on their way to school, who were hardly hurt at all.

"The aviators were men of humour. Besides the bombs they dropped a flag and a note. The note said that 'Nancy' would soon become a German town and would be destroyed by a hail of mitrailleur bullets and by fire. Fastened to the flag was a second note, rather more explicit in its terms, which I had the pleasure of reading. It ran as follows :—

"We bid good-day to the inhabitants of Nancy, who will soon be Germans, and we apologise for this rather eccentric method of introduction by means of powder, but we shall soon become better acquainted. Signed,

Lieutenants Wimmer and Schneider.

Aviation Officers of Strassburg."

"I was only half-dressed when I heard the explosions, which followed each other at intervals of a few seconds at about half-past 8, and when I got down into the street the Taube was rapidly rising as it flew towards —, till it was considerably more than a mile up in the air. A squad of about 30 men fired at it from the end of our street, and others at the different military posts in the town had a go at it with their rifles, but as far as we could see without doing it any harm. Smoothly and rapidly it disappeared in the distance eventually followed by a French biplane.

"I have just heard, though the report is not yet officially confirmed, that the Taube got separated from its companion and was brought down by the French at Custines, a few miles from here. The machine seems to have caught fire, and it is said that the bodies of the two officers were burnt—a grimly tragic answer to their grimly facetious notes. The particular place which they chose for the launching of their bombs rather points to the fact that there are still spies at work in the town. If that is so, the whole of the incident—the spies, the Taube, the bombs, the injury to civilians, the terrorism, the arrogance, and the fall—together forms a very complete little parable of the course of the war."

The way in which rumours start and grow is shown by the following incident recorded by the *Daily Telegraph* correspondent at Harwich :—

"It was rumoured in Harwich this evening that a Zeppelin had been seen flying on the North Sea to-day, surrounded by British destroyers. The story was brought into this port by members of the crew of the Great Eastern Railway Company's steamer Colchester, which arrived late in the afternoon from Rotterdam. On enquiry I have ascertained that when within twenty-five miles of Harwich the crew of the Colchester saw a large object of a yellowish tint afloat on the water, with two destroyers near by. The weather was hazy, and it was difficult at a distance to determine precisely what the object was. One of the destroyers fired at it; the other steamed away. The true explanation of the incident is now stated in naval circles to be that the supposed Zeppelin was merely a dead whale, and that the carcass was fired at with the object of sinking it.

"Did it look like a whale?" I asked a member of the steamer's crew.

"Oh, yes, it might have been," he answered."

An official statement said that in the forenoon of the 14th inst. a section of the naval squadron outside Tsingtau destroyed portions of the Ilitis and Kaiser forts, while simultaneously aeroplanes dropped bombs.

On Oct. 16th, Mr. George Renwick sent the following message to the *Daily Chronicle* :—

"Yesterday afternoon a Taube appeared over Dunkirk and dropped two bombs. The first fell at Malo-les-Bains, beside the

town. It is difficult to say what the airman was aiming at particularly, and the bomb fell where it did little or no harm. The second shot might have had serious consequences had the aim been good. It was dropped at Pte. Synthe, on the other side of the town, and it was evidently the intention of the aviator to wreck a train. The bomb fell, however, about a hundred yards from the line. The airman, in order to drop the second bomb, became rather too daring and came down from a considerable height to plant his shot. That brought him within rifle range and he met with volley after volley from the troops below. Shots so damaged the machine that the airman had to descend. He reached the earth unhurt and was at once made prisoner."

From other sources it was reported that shortly after another aeroplane appeared, and dropped a bomb in a field near Capellee, a village $3\frac{1}{2}$ miles south of Dunkirk, also an obvious attempt on the railway from Dunkirk to Cassel.

Writing from Petrograd on October 17th, the *Daily Telegraph* correspondent said :—

"The Russian foot soldier, too, though he has a great respect for the German aeroplanes and heavy artillery, is fully convinced of his own superiority to the enemy's infantry."

"That city, it now appears, has, during the past couple of weeks, been several times visited by bomb-throwing aeroplanes, which directed their attention chiefly to the stations, gas works, and similar institutions. They seem to have done but little harm, and to have been regarded by the inhabitants rather with curiosity than dread. Thousands of people thronged the streets watching the white puffs from the Russian shrapnel, bellying out round the soaring aviators. While one of these aerial visitors was about the roofs, bridges, and open spaces were manned with riflemen, whose shooting rang out in an unbroken rattle. One of the enemy's aeroplanes was compelled to descend beyond Novogeorgijewsk."

According to despatches from Berlin, received in Copenhagen on October 16th, Germans in the neighbourhood of Peronne shot down a British airman, and he and his passenger were captured.

The following incident in the fighting on the Vistula was recorded by an *Evening Standard* correspondent :—

"During the night Russian infantry with four quickfiring were hid in dense bushes near the river (by Yusevoff). Some distance back sixteen field guns were concealed. A German aeroplane flew over the spot next morning but perceived nothing. The Germans then began crossing the river in rafts. The Russians allowed two battalions to land, preceded by a detachment of sappers to prepare the landing, who unknowingly came within 400 yards of the Russian telephonists, who were invisible in the bushes. The Russians then opened gun and rifle fire. It is said that every man who crossed the river was either shot or fell a victim to the bayonet charge with which the Russians finished their deadly work."

According to a message sent from Cettinge on Saturday an Austrian aeroplane coming from Castelinova dropped several bombs, but did not succeed in doing any damage.

According to the *Daily Telegraph* a German aeroplane is said to have passed over Amiens on Sunday dropping two bombs on the way :—

"One of these was thrown at midday and fell about 100 yards from the Station of Saint-Acheul, in a front garden. It landed without exploding. The other missile fell in the middle of the roadway, where it immediately burst, injuring a tram-driver and a passer-by. A gendarme standing quite near escaped with very slight injuries. French aviators chased the uninvited guest, who is reported to have been brought down near Abbeville. Another Taube passed the same day over the town of Eu. No damage is reported from this place, however."

A German machine was also reported from Compiègne as flying toward Paris. It, however, turned tail when chased by the French aeroplanes which were patrolling Paris in spite of the fog and rain.

According to the *Evening Standard*, three German officers, two of whom are stated to be airmen, arrived at Kingstown on Sunday in charge of an escort. They were conveyed to Templemore.

The impression made in the United States by the

dropping of bombs on Paris can be gathered from the following comments taken from New York papers:—

The *Herald*, in an editorial article, said:—

"Another famous victory is reported from Paris. There have been more bombs and more peaceful non-combatants killed and maimed. This is not warfare, but assassination from the air, and from the military standpoint it would seem that instead of being of value to the Germans, these Taube raids prove boomerangs to them. The raids have shown that individuals can be killed by bombs, and nothing more. This has already been demonstrated in New York's east side. A Taube may be more spectacular than the Black Hand, but as a war machine it is ineffective. The demonstration of this robs the Kaiser of such an asset as he had in the promised Zeppelin raids. The Taube has dispelled the spectre of the threatened destruction of cities by dynamite and other high explosives rained from the clouds, for an airship, whatever its type, can do nothing more than the Taubes have done."

The *Tribune* said:—

"To drop bombs on a city situated 70 miles from the nearest battle line, with no other result than to destroy private property and kill women and children, is not to carry on civilised warfare, but is a clear violation of the guarantees to non-combatants. It slays the innocent without cause, and wantonly destroys private property without military justification, an action explicitly condemned by The Hague Convention as pillage."

In this connection Mr. G. Bateman, the *Daily Chronicle* representative, cabled from New York:—

"Two hundred passengers aboard the liner 'Olympic' have passed resolutions denouncing Germany's use of aviation bombs to the peril of women and children. It has been directed that a copy shall be sent to President Wilson, with a personal letter urging that steps should be taken immediately to forestall the setting free of Zeppelins for the bombardment of Paris and London. The letter, in strong terms, tells the President that citizens feel that a question of humanity is involved, and any Power refusing to give heed to President Wilson's wise and humane counsel would forfeit the sympathy of the world. It was argued that Germany has defied the civilised world, and defied the right of anyone but itself to live and prosper. America is becoming increasingly indignant at the barbaric methods of Germany, which extort from public men outspoken sentiments despite the deep desire to respond to the President's neutrality call."

Writing from Rotterdam to the *Daily Mail* on Monday, Mr. James Dunn said that his Maastricht correspondent reported that three Zeppelin sheds are building at Brussels and four at Antwerp.

The *Morning Post* correspondent at Amsterdam telegraphed on October 19th:—

"A Zeppelin airship was seen above the island of Vlieland, one of the Frisian Islands, to-day, going in an eastern direction."

The following was included in the batch of German "wireless" news sent out from Berlin on October 20th:—

"An enemy's aeroplane attempted to observe our position in France, but was driven back by shrapnel. The aviation problem is wonderfully handled by the German forces, and the French aeroplane work is not to be compared with our own. So far Germans have destroyed on an average one aeroplane daily. The efficiency of the German war machine is shown in every part of the theatre of war, and the machine is working with an uncanny silent perfection. There is no excitement and no confusion anywhere. Horses have practically been superseded by motor transport."

Writing from Petrograd on Tuesday with regard to Russia's reserves, the *Morning Post* correspondent said:—

"There is ample reserve strength to draw upon, and it is apparently beyond the ken of the German aeroplanes and Zeppelins, which so frequently amuse themselves with dropping bombs in places where no military result could possibly be attained and

afford no outlet for the sporting instincts of the Polish guerrilla bands and the ubiquitous Cossacks."

The following message from Paris was sent by the *Daily Telegraph* on Tuesday:—

"The French aviators affirmed their mastery of the air yesterday. Patrols of biplanes and monoplanes kept inviolate the skies of Paris, and that in spite of clouds, mists, and fierce air-storms."

"One French machine, mounted by two officers, issuing from a thick blanket of cloud, found itself fifty yards above the church of the Sacré Cœur, at Montmartre. Though caught in a fierce swirl of wind, the aeroplane skilfully manœuvred and reached its base in safety."

In a message from Dover the Press Association correspondent stated that in the fighting off the Belgian coast on Sunday, a Taube and a Zeppelin were brought down, but no official confirmation is to hand.

In an article discussing the possibilities of an airship attack on London, the correspondent of the *Morning Post*, who was in Antwerp during the Zeppelin attacks, states that, except on the first occasion, when the military authorities were unprepared, the bombs which were dropped did not do serious damage. It will be recalled that the first raid resulted in several persons being killed and injured, but on the second visit there was no loss of life, and as soon as the airship came under observation and fire, it retired. "The third attack was during the siege, and seems to have been designed to attack the forts. Absolutely no damage was done by it."

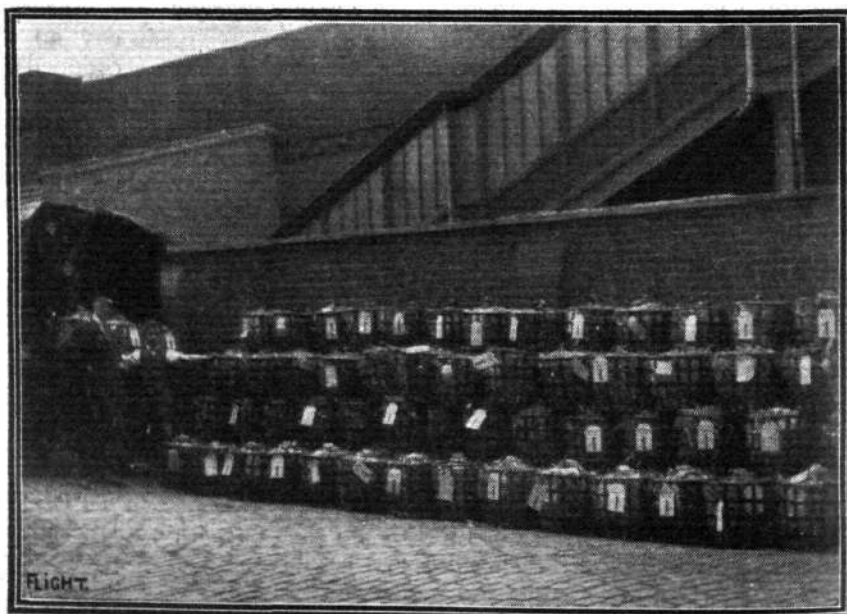
In view of the experiences at Antwerp, however, the *Morning Post* correspondent suggests the following precautions for London:—

"1. Search light protection from high points around London, but at least 10 miles from London; and strong search light protection along the section of coast-line of England which a hostile airship would cross."

"2. Special gun protection, well outside of London, especially guns of the type employed by the French Army, mounted on fast motor-cars, with good anchoring spades and special sights for marks in the sky."

"3. Aeroplane and airship scouts on the sea-coast."

"So far as one can judge by Antwerp experience, guns firing at an airship from within a city do more damage to the city than to the airship. Once an airship were over the area of London, attack, except by shell which would altogether burn itself out in explosion, would be more dangerous than protective. If shrapnel is fired at an airship over a populated area the shell case may kill someone as it comes down. Reduction of a city's lights has some advantage certainly."



A SIGN OF THE TIMES.—A few carboys of Emaillite dope stacked ready for delivery from the British Emaillite Co., Ltd.'s, works.

Models

Edited by V. E. JOHNSON, M.A.

Mr. Travers Ayers' Ornithopters.

SOME of the earliest, if not the earliest, of man's endeavours to conquer the realm of the air—so far, that is, as aerial travel is concerned, were made by man-worked machines of the flapping type. It was nature's method of solving the problem, then wherefore not man's? No success of any real practical good was obtained, nevertheless these experiments were not without value, and if some of the accounts, even when due allowance is made for great exaggeration, are to be believed, some success, of a very limited character it is true, was obtained. So far as I remember, the particular instance I have in mind was a machine in which the man, by suitable mechanism, was able to use all the most powerful muscles of his body, legs as well as arms, at the same time. A comparison can be drawn between this and rowing by comparing the ordinary attempts at "man-flappers" to a man rowing a boat in the usual way and in the other case to a man provided with a sliding seat by means of which the powerful leg muscles are brought into play as well as those of the arms. We must also never forget that the motored machine of the present day with all its almost incredible achievements is the direct outcome of the man-carrying glider experiments of Lilienthal, Pilcher, Chanute and the Wrights, supplemented and indeed rendered possible only by the advent of the internal-combustion motor. Bearing these facts in mind and remembering that there is always more than one way of doing anything, it is only right and indeed only sensible that attempts to solve the problem of flapping flight should be placed on record even if they have not in themselves met with any great practical success—at the stage at which they were abandoned. We can neglect nothing in this direction, because we do not yet know where the germ of success lies. Success always comes through failure.

Under such circumstances, and taking a broad and perfectly unbiassed view of the subject, we present this week to our readers some drawings and particulars of two machines with which Mr. Travers Ayers has carried out some experiments.

Referring to Fig. 1, the span tip to tip of wings is 25 ft. and the weight 50 lbs. To manipulate this ornithopter the pilot, whose shoulders are suitably strapped to BB, stands on platform A, the weight of the man upon which pulls down CC, and the latter being fastened to the wing arms forces them in an upward position. Upon the pilot relieving A of his weight and transferring it to BB, and by resting on the shoulder straps, the movement of the wing arms is thus reversed, and the flapping of the wings is accomplished by the weight of the pilot being alternately transferred from A to BB. In the drawing some of the bracing, wires, &c., have been left out for the sake of clearness of the method of working.

Referring to Fig. 2, this machine has a wing span of 16 ft., and a tail span of 5 ft.; it is designed on the principle of the vulture.

The main arms are of bamboo and follows the placement of the bones in the bird. To these are attached the ribs of the feathers, which are of tapering canes; the whole length of these are drilled

with holes through which are fastened the bristles from a stiff broom; the whole is then covered with light waterproofed material. The tail is constructed on the same principle.

The wing-arms work on a pivot attached to the saddle, which in turn is strapped to the pilot's back. The pilot then holds the arms, PB, and proceeds to run along the ground, flapping the while.

This has actually been tried on Tooting Common with the following result:—Firstly, elastic was placed upon the hooks, AA, and connected to king post, C, and when running along the ground the

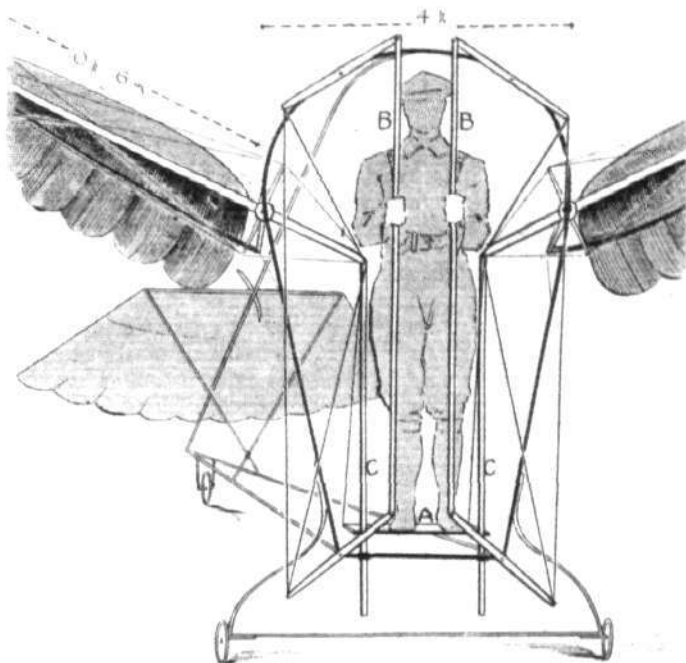
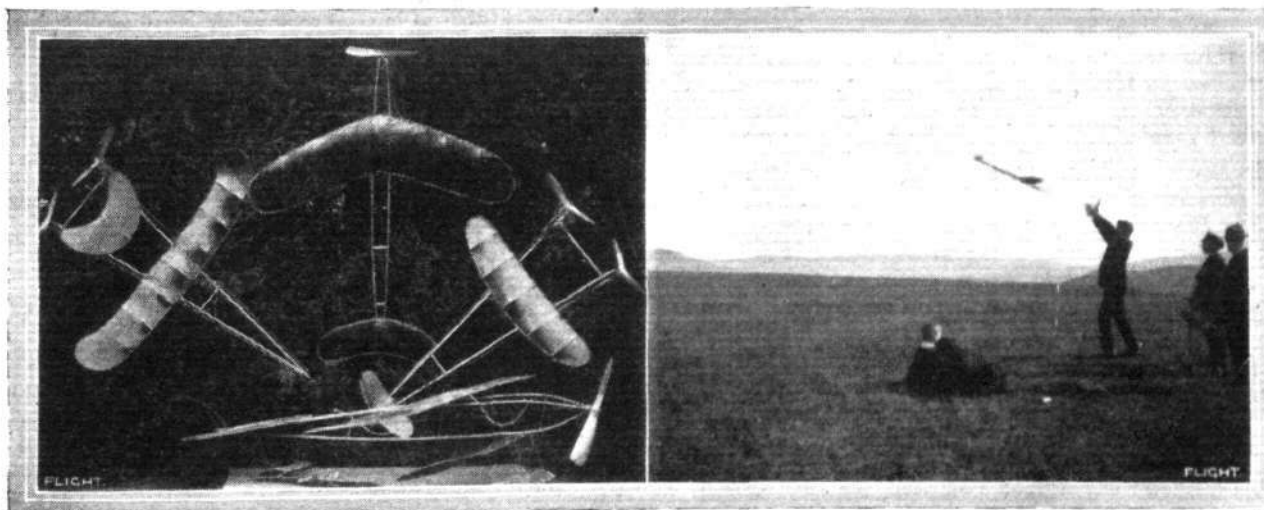


Fig. 1.—One of Mr. Travers Ayers' ornithopters.

air pressure on the under surface of the wings, coupled with the elastic, made it extremely difficult to lower them. The elastic was then removed, the result being considerably better. Again, the elastic was attached to the arms, BB, connected to the belt, D, giving decidedly the best results.

It has never been tried from a slope, but only from the level, thus it was not under the best advantages; nevertheless a distinct flap of the wings was often obtained when off the ground. In actual flight the bird then only uses power on the down stroke.



AERONAUTICS IN NEW ZEALAND.—Some models of the Dunedin Aero Club (N.Z.), and, on the right, launching a machine at the Club's flying ground.

Mr. Gilbert's Orthopter.

Referring to the recent article on this model on page 1029 line 2, 3 inches should be 3 feet.

Mr. O. Hamilton, junr., calling our attention to the above clerical error, says: "I have had no experience of such a type, but from reading the article on the design and construction of the same, I should deduce that the method of wing construction would give a flexible rear edge, that would, during *i.e.* the up and down stroke, flex automatically in the manner in which a bird's wing flexes.

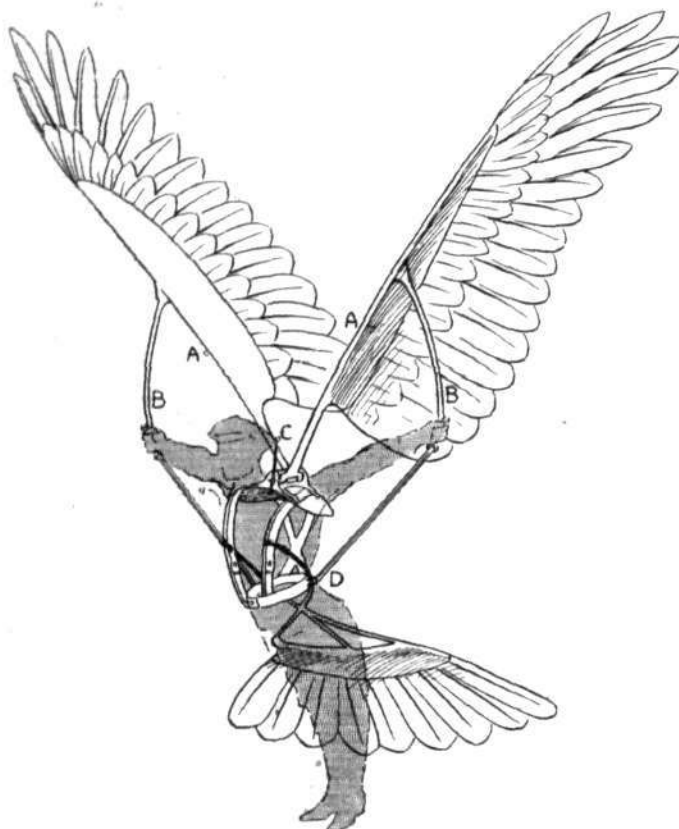


Fig. 2.—Another of Mr. Travers Ayers' experimental machines.

With respect to the design of the elevator, both from an artistic view as well as from that of resistance, it would be better perhaps to use a different shape to the rectangular; a crescent shape, say, conforming as near as possible to the shape of a bird's head, thus tending to direct the air stream in regular formation to the wings, *i.e.*, the main plane in the rear, and also to produce an extended leading edge, a most noticeable feature in a bird's wing."



KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	J. E. Louch	95 secs.
Twin screw, do. ...	Distance ...	R. Lucas	590 yards.
	Duration ...	T. D. Collingwood	
		Chown ...	145 secs.
Single screw, rise off ground	Distance ...	W. E. Evans	290 yards.
	Duration ...	J. E. Louch	68 secs.
Twin screw, do. ...	Distance ...	L. H. Slatter	365 yards.
	Duration ...	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton	266 yards.
	Duration ...	J. E. Louch	91 secs.
Do., off-ground	Distance ...	C. C. Dutton	190 yards.
	Duration ...	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter	35 secs.
Single-tractor, do., do.	Duration ...	C. C. Dutton	29 secs.
Twin screw, do., do.	Duration ...	S. C. Hersom	65 secs.
Engine driven off grass	Duration ...	D. Stanger	51 secs.

Notices.—By special request two of the Association's observers attended at Wimbledon Common on Saturday last to witness Mr. Chown's (Wimbledon and District Model Aero Club) attempt to break the hand-launched twin-screw (1.1.0.2P) duration record. There was a strong N.N.E. breeze, and Mr. Chown's first flight finished right out of sight in the hollow on the southern part of the common only 6 secs. short of record time, and was, as far as the observers could see, still going strong. In his second attempt, however, he started his flight at a point considerably further north, and finished well within view, with a duration of 145 secs.

All communications with regard to models should be sent to H. A. Lyche, 46, Templeshreen Road, East Sheen, S.W.

AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Ae.C. (14, LEYTONSTONE RD., STRATFORD)

OCT. 25TH, flying as usual on Wanstead Flats, 10 a.m. B section competition, single-screw tractor, 10.30 prompt. Nov. 8th, A section competition, twin-screw tractor, 10.30 prompt. If wet meet at club-room.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

OCT. 31ST, 3.30 p.m., hydro-aeroplane contest for "The President's Challenge Cup" at Tinsley Park Brickyard. Competitors must be at the judge's flag between 3 and 3.15 p.m.

UNAFFILIATED CLUBS.

S. Eastern Model Ae.C. (154, PECKHAM RYE, S.E.)

USUAL flying meetings on Blackheath and at the Lee Aerodrome this week. end. The rules for the next South-Eastern Trophy Competition will appear next week.



Double Fatality in Germany.

ACCORDING to advices received in Amsterdam during a cross-country flight from Doeberitz, on October 16th, a German military aeroplane, when near Rathenow, suddenly crashed to the earth. The pilot was killed and the passenger seriously injured.

Sharing the Honours.

IN connection with the winning of the £5,000 by the Green engine No. 1 in the Naval and Military Aeroplane Engine Competition, it may be noted that the fuel used was Shell motor spirit, while "Mobiloil BB" was relied upon for lubrication.

Makers of Shock-Absorbers.

WE learn that the Scientific Model Co. have facilities at their works at 40 and 41, Brown's Road, Surbiton, Surrey, for the manufacture of aeroplane shock-absorbers of any description in all sizes from 8 mm. to 45 mm., together with any special fittings.



PUBLICATIONS RECEIVED.

Romance of Reality Series: The Aeroplane. By Claude Grahame-White and Harry Harper. London: T. C. and E. C. Jack, 67, Long Acre. Price 3s. 6d.

Report on European Aeronautical Laboratories. By A. F. Zahm, Ph.D. Washington, U.S.A.: The Smithsonian Institution.

Bartholomew's Reduced Survey Map of N.E. France, Belgium, and the Rhine. Edinburgh: John Bartholomew and Co. Price 2s. net.



NEW COMPANIES REGISTERED.

British Bachelet Flying Train Synd., Ltd., 166, Piccadilly, W.—Capital £10,000, in 1s. shares. Proprietors and builders of railways, tramways, mechanical manufacturers and suppliers of balloons, flying machines, and other contrivances for aerial navigation.

Creser's Rotary Motor, Ltd., 16, Southampton Street, Bloomsbury Square, W.C.—Capital £250, in £1 shares. Acquiring an invention relating to internal-combustion rotary engines, manufacturers of hydroplanes, aeroplanes, motor cars, &c. First directors, R. M. Neate and E. C. Stileman.

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